REPLACED BY ART 34 AMDT

What is claimed is:

1. A separator especially for lithium high energy batteries, comprising a sheetlike flexible substrate having a multiplicity of openings and having a porous inorganic coating on and in said substrate, the material of said substrate being selected from a nonwoven of electrically nonconductive polymeric fibers, characterized by a weight of less than 50 g/m^2 and a thickness of less than 35 μm.

2. The separator of claim 1, characterized by a weight of less than 20 g/m^2.

3. The separator of either of claims 1 and 2, characterized by said polymeric fibers being selected from fibers of polyacrylonitrile, polyester and/or polyolefin.

4. The separator of at least one of claims 1 to 3, characterized by said polymeric fibers being from 0.1 to 10 μm in diameter.

5. The separator of at least one of claims 1 to 4, characterized by said flexible substrate having a porosity of from 50% to 97%.

6. The separator of at least one of claims 1 to 5, characterized by said flexible substrate being less than 30 μm in thickness.

7. The separator of claim 6, characterized by said nonwoven being less than 20 g/m^2 in weight.

8. The separator of any of claims 1 to 7, characterized by said coating on and in said substrate comprising an oxide of the metals Al, Zr and/or Si.

9. The separator of at least one of claims 1 to 8, characterized by a porosity of from 30% to 80%.

10. The separator of at least one of claims 1 to 9, characterized by a breaking strength of more than 1 N/cm.

11. The separator of at least one of claims 1 to 10, characterized by being bendable around a radius down to 100 m without damage.

12. The separator of at least one of claims 1 to 11, characterized by being bendable around a radius down to 0.5 mm without damage.

13. A process for producing a separator as claimed in at least one of claims 1 to 12, which comprises providing a sheetlike flexible substrate having a multiplicity of openings with a coating on and in said substrate, the material of said substrate being selected from nonwovens less than 30 µm in thickness of electrically nonconductive fibers of polymers and said coating being a porous electrically insulating ceramic coating.

14. The process of claim 13, wherein said porous ceramic coating is prepared by applying a suspension comprising at least one oxide of the elements Al, Zr and/or Si and a sol of at least one of the elements Al, Si and/or Zr to said substrate and heating one or more times to solidify said suspension on and in said substrate.

15. The process of claim 14, wherein said fibers are selected from polyacrylonitrile, polyester or polyolefin.

16. The process of either of claims 14 and 15, wherein said suspension is brought onto and into said substrate by printing on, pressing on, pressing in, rolling on, knifecoating on, spreadcoating on, dipping, spraying or pouring on.

17. The process of any of claims 14 to 16, wherein said sol is prepared by hydrolyzing at least one alkoxide compound of the elements Zr, Al and/or Si or at least one nitrate, carbonate or halide of the elements Zr, Al and/or Si.

18. The process of at least one of claims 14 to 17, wherein metal oxide particles having an average primary particle size of from 5 to 100 nm are suspended.

19. The process of claim 18, wherein metal oxide particles having an

average primary particle size of from 7 to 50 nm are suspended.

20. The process of at least one of claims 14 to 19, wherein the mass fraction of said suspended component is from 1 to 100 times that of the sol used.

21. The process of at least one of claims 14 to 20, wherein said suspension present on and in said support is solidified by heating at from 150 to 500°C.

22. The process of claim 21, wherein said heating is effected at from 200 to 280°C for from 0.5 to 10 minutes.

23. The use of a separator as claimed in at least one of claims 1 to 12 as a separator in lithium batteries.

24. A battery comprising a separator as claimed in at least one of claims 1 to 12.